CLAIMS

1. A data recording and display unit (1) that may be constructed

from different units (3) connected by a control bus (12) and a basic unit (2), each with means for data recording and data storage, characterised in that

- the units (3) and the basic unit (2) are constructed from

- at least one module(4) which comprises at least
  - one sensor (5),
  - one controller (10),
  - one memory (11)
    and the following may optionally be present between at least one sensor) and the controller (10);
  - a transmitter (6) and a transmitter (7)
  - an amplifier (8),
  - a converter (9) or
  - an amplifier (8) and a converter (9),

wherein at least one sensor (5) is connected to the remaining components of the module (4) by a cable (30) or wireless connection (32),

- the units (3) are synchronised by a single real time clock
  (20) on the basic unit (2)
- each measuring point is stored together with the clear time of the measurement generated by the real time clock(20).

2. The data recording and display unit (1) according to Claim 1, characterised in that the basic unit (3) additionally comprises

- a controller (22) which is connected to
  - a display module (17),
  - control elements (18),
  - LED's (19) for indicating the operating status of the data recording and display unit (1) and
  - the real time clock (20),
- a communications controller 23) which is connected to
  - a signal converter (24).

3. The data recording and display unit (1) according to Claim 2, characterised in that
   - the control bus (12) connects the controller (22) to the communications controller (23) and the controllers (10) on the basic unit (2) and the units (3).
   - A data bus (13) connects all the memories (11) on the basic unit (2) and the units (3) directly to the communications controller (23).

4. The data recording and display unit (1) according to Claim 3, characterised in that it can be connected by the communications controller (23) and the signal converter (24) to a serial or parallel interface (25) of a computer (21) for data exchange.

5. The data recording and display unit (1) according to Claim 3, characterised in that a transmitter module (32) takes over at least some of the functions of the communications controller (23) and transmits data to a computer (21) using the transmission technology integrated on the transmitter module (32).

6. The data recording and display unit (1) according to Claim 3, characterised in that one module (4) is present on the basic unit (2) for measuring each of

the following: triaxial accelerations, pressure and temperature.

7. The data recording and display unit (1) according to Claim 6 and any one of Claims 5 or 6, characterised in that the basic unit (3) is installed in a convenient housing (26), and in that the housing (26) provides space for a maximum of three further units and the control elements (18) of the basic unit (2) are also integrated in the housing (26), and in that a plug connection 14 is also integrated in the housing (26) so that further units may be connected.

8. The data recording and display unit (1) according to Claim 6 and any one of Claims 5 or 6, characterised in that a plurality of plug connections (14) is installed on a baseplate (29), into which connections are inserted the basic unit (2) and units (3) for fixing and connecting to the data bus (13) and control bus (12).

9. The data recording and display unit (1) according to Claim 6 and any one of Claims 5 or 6, characterised in that it records data from a motor vehicle or aircraft.

10. The data recording and display unit (1) according to Claim 6 any one of Claims 5 or 6, characterised in that it records medical and/or sports medical data.

11. The data recording and display unit (1) according to Claim 1,characterised in that a module (4) comprises a measuring unit (33), a controller (10) and a storage unit (11), and in that an amplifier (8), a converter (9) or both components (8, 9)may be present, according to the format of the data from the measuring instrument (33).

12. The data recording and display unit (1) according to Claim 1,characterised in that the memories (11) of the modules (4) are divided into pages (42), which in turn each consist of a header (43) and a data area (44), in that configuration data from a measurement are stored in the header (43) and the measured data together with the times of the measurement are stored in the data area (44), so that the measurement can only be reproduced from the data in the memories (11).

13. The data recording and display unit (1) according to Claim 1, characterised in that the modules (4) are able to withstand major force and heat influences without damage.

14. The data recording and display unit (1) according to Claim 1, characterised in that a multi-master operation is supported.

15. A control program for a data recording and display unit (1) according to any one of the preceding claims, characterised in that it consists of the network ready components setup, reader, online and viewer, wherein
    - the setup component automatically detects connected modules (4) and makes available, for each of these modules (4), a graphic interface for the configuration of each module (4),
    - the reader component reads measured values stored in the
    - memories (11, transmits them via the data bus (13) to
      the computer (21) and stores them in files,
    - the online component represents current measured values

    graphically or numerically,

wherein the components consist of routines which run in one of the controllers (10, 22, 23), on the computer (21) or in a network.

16. The control program for a data recording and recording unit (1) according to Claim 15, characterised in that the same control program is always used with the units (3) of the data recording and display unit (1), irrespective of the modular structure.

AMENDED CLAIMS

[received by the International Office on 22 March 2005 (22.03.05); original Claims 1-16 replaced by amended Claims 1-13 (4 pages)]

1. A data recording and display unit (1) that can be connected
for data exchange by means of a communications controller (23) and a signal converter (24) to a serial or parallel interface (25) of a computer (21), consisting of various units (3) and a basic unit (2), which are connected to each other by a control bus (12) and a data bus (13), and are synchronised by means of a single real time clock (20) on the basic unit, and of at least one module (4) which
   - comprises at least a sensor (5), a controller (10) and a memory (11) for recording and storing data,
   - optionally may have a transmitter and receiver, amplifier, converter or combinations thereof between sensor (5) and controller (10),
   - stores in its memory (11) each measuring point together with the clear time of the measurement generated by the real time clock(2),

   characterised in that
   - even without an exchange of modules many sensor combinations are made possible by connecting different combinations of sensors to a module,
   - the modules (4) themselves record the sensor combinations connected to them by carrying out a setup routine after the unit (1) is switched on,
   - the configuration data for the individual sensors (5) remain stored to enable sensors (5) already configured to be connected or omitted without this necessitating a reconfiguration on the PC (21).

2. The data recording and display unit (1) according to Claim 1, characterised in that
commercially available measuring instruments can be incorporated in the same way as sensors by means of special modules, and supply measured values synchronised by this method of incorporation with the other modules installed.

3. The data recording and display unit (1) according to Claim 1, characterised in that
   - the control bus (12) connects the controller (22) to the communications controller (23) and the controllers (10) on the basic unit (2) and the units (3),
   - a data bus connects all the memories (11) on the basic unit (2) and the units (3) directly to the communications controller (23).

4. The data recording and display unit (1) according to Claim 3, characterised in that a module (4) is present on the basic (2) for measuring each of the following: triaxial accelerations, pressure and temperature.

5. The data recording and display unit (1) according to Claim 1, characterised in that any module (4), for example a transmitter module, is able to take over control of the control bus, wholly or in part (Multi-master operation).

6. The data recording and display unit (1) according to Claim 5, characterised in that
   - a transmitter module is able to read the measured data via the data bus (13) and transmit the data to a computer (21),
   - the transmission method (WLAN, Bluetooth, radio, etc.) can

be freely selected by means of corresponding modules.

7. The data recording and display unit (1) according to Claim 4, characterised in that
   - the basic unit is installed in an easy to handle housing (26),
   - the display module (17) and the control elements (18) of the basic unit (2) are also integrated in the housing (26),
   - a plug connection is integrated in the housing (26) so that further units may be connected.

8. The data recording and display unit (1) according to Claim 3, characterised in that a plurality of plug connections (14) is installed on a base plate (29), into which connections the basic unit (2) and units (3) may be inserted for fixing and for connecting to control bus (12) and data bus (13).

9. The data recording and display unit (1) according to Claim 6 and any one of Claims 5 or 6, characterised in that it can record data from a motor vehicle or aircraft.

10. The data recording and display unit (1) according to Claim 6 any one of Claims 5 or 6, characterised in that it can record medical and/or sports medical data.

11. The data recording and display unit (1) according to Claim 1, characterised in that the memories (11) of the modules (4) are divided into pages (42), which in turn each consist of a header (43) and a data area (44), in that configuration data from a measurement are stored in the header (43) and the measured data together with the times of the measurement are stored in the data area (44), so that the measurement can only be reproduced from the data in the memories (11).

12. The data recording and display unit (1) according to Claim 1, characterised in that the modules (4) are able to withstand major force and heat influences without damage due to a special method of construction, for example casting in resin and equipping with ceramic heat shields.

13. A control program for a data recording and display unit (1) according to any one of the preceding claims, which unit comprises the network ready components setup, reader, viewer and online, characterised in that

- the online component enables the measured data from all the sensors to be displayed in parallel in real time on the PC (21) both as raw data and graphically,
- the user surface on the PC (21) is automatically adapted so that for the modules (4) and sensors (5) recorded by the setup component a graphic interface is made available for the configuration of the same, and so that only the components that are actually connected can be configured.